

# **LAPORAN PRAKTIKUM SISTEM OPERASI**



**Disusun Oleh :**

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**FAKULTAS KOMUNIKASI DAN INFORMATIKA  
UNIVERSITAS MUHAMMADIYAH SURAKARTA  
TAHUN AJARAN 2021/2022**

## Lembar Kerja Modul 2

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<b>Dosen Pengampu</b> : Heru Setiya Nugraha, S.T., M.Kom.	Tanda Tangan :
<b>Asisten Dosen</b> : 1. Calvin Alvito 2.	
<b>Tanggal Praktikum</b> : Selasa, 20 September 2022	

Tugas berada di bawah setelah laporan percobaan modul 2.

Nama "Galih" pada cmd yaitu nama kakak saya bukan nama mahasiswa lain.

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

### PERCOBAAN MODUL 2

“ Membuat Program Bootstrap Loader Sederhana Pada Sebuah Disk “

Ketik “ cd \ “ lalu ketik “ cd os “

```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 10.0.19044.2006]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Galih>cd \

C:\>cd os

C:\OS>_
```

Ketik **“ setpath ”**

```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 10.0.19044.2006]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Galih>cd \

C:\>cd os

C:\OS>setpath

C:\OS>Path=C:\OS\Dev-Cpp\bin;C:\OS\Bochs-2.3.5;c:\OS\Perl;C:\Windows;C:\Windows\System32
C:\OS>
```

Ketik **“ cd lab/lab2 ”**

```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 10.0.19044.2006]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Galih>cd \

C:\>cd os

C:\OS>setpath

C:\OS>Path=C:\OS\Dev-Cpp\bin;C:\OS\Bochs-2.3.5;c:\OS\Perl;C:\Windows;C:\Windows\System32
C:\OS>cd lab/lab2

C:\OS\LAB\LAB2>_
```

Ketik “**dir**” untuk melihat isi directory

```
C:\WINDOWS\system32\cmd.exe
C:\>cd os

C:\OS>setpath

C:\OS>Path=C:\OS\Dev-Cpp\bin;C:\OS\Bochs-2.3.5;c:\OS\Perl;c:\Windows;c:\Windows\System32
C:\OS>cd lab/lab2

C:\OS\LAB\LAB2>dir
Volume in drive C is OS SSD
Volume Serial Number is F8C1-8320

Directory of C:\OS\LAB\LAB2

25/09/2019  16.35    <DIR>          .
25/09/2019  16.35    <DIR>          ..
11/10/2019  14.42           10.184 bochsout.txt
15/12/2008  16.17           1.628 bochsrc.bxrc
25/09/2019  16.29           14.359 boot.asm
25/09/2019  16.31           512 boot.bin
16/09/2015  07.51           512 boots.bin
15/12/2008  00.47           78 dosfp.bat
25/09/2019  16.42          1.474.560 floppya.img
25/09/2019  16.41           7.971 kernel.asm
25/09/2019  16.41           616 kernel.bin
15/12/2008  16.21           227 Makefile
15/12/2008  12.20           44 s.bat
               11 File(s)          1.510.691 bytes
               2 Dir(s)  90.982.375.424 bytes free

C:\OS\LAB\LAB2>
```

Ketik “**bximage**”

```
C:\WINDOWS\system32\cmd.exe - bximage
Volume in drive C is OS SSD
Volume Serial Number is F8C1-8320

Directory of C:\OS\LAB\LAB2

25/09/2019  16.35    <DIR>          .
25/09/2019  16.35    <DIR>          ..
11/10/2019  14.42           10.184 bochsout.txt
15/12/2008  16.17           1.628 bochsrc.bxrc
25/09/2019  16.29           14.359 boot.asm
25/09/2019  16.31           512 boot.bin
16/09/2015  07.51           512 boots.bin
15/12/2008  00.47           78 dosfp.bat
25/09/2019  16.42          1.474.560 floppya.img
25/09/2019  16.41           7.971 kernel.asm
25/09/2019  16.41           616 kernel.bin
15/12/2008  16.21           227 Makefile
15/12/2008  12.20           44 s.bat
               11 File(s)          1.510.691 bytes
               2 Dir(s)  90.982.375.424 bytes free

C:\OS\LAB\LAB2>bximage
=====
                        bximage
                Disk Image Creation Tool for Bochs
                $Id: bximage.c,v 1.32 2006/06/16 07:29:33 vruppert Exp $
=====

Do you want to create a floppy disk image or a hard disk image?
Please type hd or fd. [hd]
```

Ketik “ fd “

```
C:\WINDOWS\system32\cmd.exe - bximage

25/09/2019 16.35 <DIR> .
25/09/2019 16.35 <DIR> ..
11/10/2019 14.42 10.184 bochsout.txt
15/12/2008 16.17 1.628 bochsrc.bxrc
25/09/2019 16.29 14.359 boot.asm
25/09/2019 16.31 512 boot.bin
16/09/2015 07.51 512 boots.bin
15/12/2008 00.47 78 dosfp.bat
25/09/2019 16.42 1.474.560 floppya.img
25/09/2019 16.41 7.971 kernel.asm
25/09/2019 16.41 616 kernel.bin
15/12/2008 16.21 227 Makefile
15/12/2008 12.20 44 s.bat
11 File(s) 1.510.691 bytes
2 Dir(s) 90.982.375.424 bytes free

C:\OS\LAB\LAB2>bximage

=====
                        bximage
          Disk Image Creation Tool for Bochs
        $Id: bximage.c,v 1.32 2006/06/16 07:29:33 vruppert Exp $
=====

Do you want to create a floppy disk image or a hard disk image?
Please type hd or fd. [hd] fd

Choose the size of floppy disk image to create, in megabytes.
Please type 0.16, 0.18, 0.32, 0.36, 0.72, 1.2, 1.44, 1.68, 1.72, or 2.88.
[1.44] _
```

Pilih 1.44 Lalu tekan <ENTER>

```
C:\WINDOWS\system32\cmd.exe - bximage

25/09/2019 16.42 1.474.560 floppya.img
25/09/2019 16.41 7.971 kernel.asm
25/09/2019 16.41 616 kernel.bin
15/12/2008 16.21 227 Makefile
15/12/2008 12.20 44 s.bat
11 File(s) 1.510.691 bytes
2 Dir(s) 90.982.375.424 bytes free

C:\OS\LAB\LAB2>bximage

=====
                        bximage
          Disk Image Creation Tool for Bochs
        $Id: bximage.c,v 1.32 2006/06/16 07:29:33 vruppert Exp $
=====

Do you want to create a floppy disk image or a hard disk image?
Please type hd or fd. [hd] fd

Choose the size of floppy disk image to create, in megabytes.
Please type 0.16, 0.18, 0.32, 0.36, 0.72, 1.2, 1.44, 1.68, 1.72, or 2.88.
[1.44]
I will create a floppy image with
cyl=80
heads=2
sectors per track=18
total sectors=2880
total bytes=1474560

What should I name the image?
[a.img] _
```

Ketik **floppya.img** . Karena ternyata saya sudah terdapat file floppya.img maka saya replace dengan mengetik **yes** dan **<ENTER> 2X**.

```
C:\WINDOWS\system32\cmd.exe
Do you want to create a floppy disk image or a hard disk image?
Please type hd or fd. [hd] fd

Choose the size of floppy disk image to create, in megabytes.
Please type 0.16, 0.18, 0.32, 0.36, 0.72, 1.2, 1.44, 1.68, 1.72, or 2.88.
[1.44]
I will create a floppy image with
  cyl=80
  heads=2
  sectors per track=18
  total sectors=2880
  total bytes=1474560

What should I name the image?
[a.img] floppya.img

The disk image 'floppya.img' already exists. Are you sure you want to replace it?
Please type yes or no. [no] yes

Writing: [] Done.

I wrote 1474560 bytes to floppya.img.

The following line should appear in your bochsrc:
  floppya: image="floppya.img", status=inserted
(The line is stored in your windows clipboard, use CTRL-V to paste)

Press any key to continue
C:\OS\LAB\LAB2>
```

Ketik **“dir”** untuk mengecek isi directorynya

```
C:\WINDOWS\system32\cmd.exe

The following line should appear in your bochsrc:
  floppya: image="floppya.img", status=inserted
(The line is stored in your windows clipboard, use CTRL-V to paste)

Press any key to continue

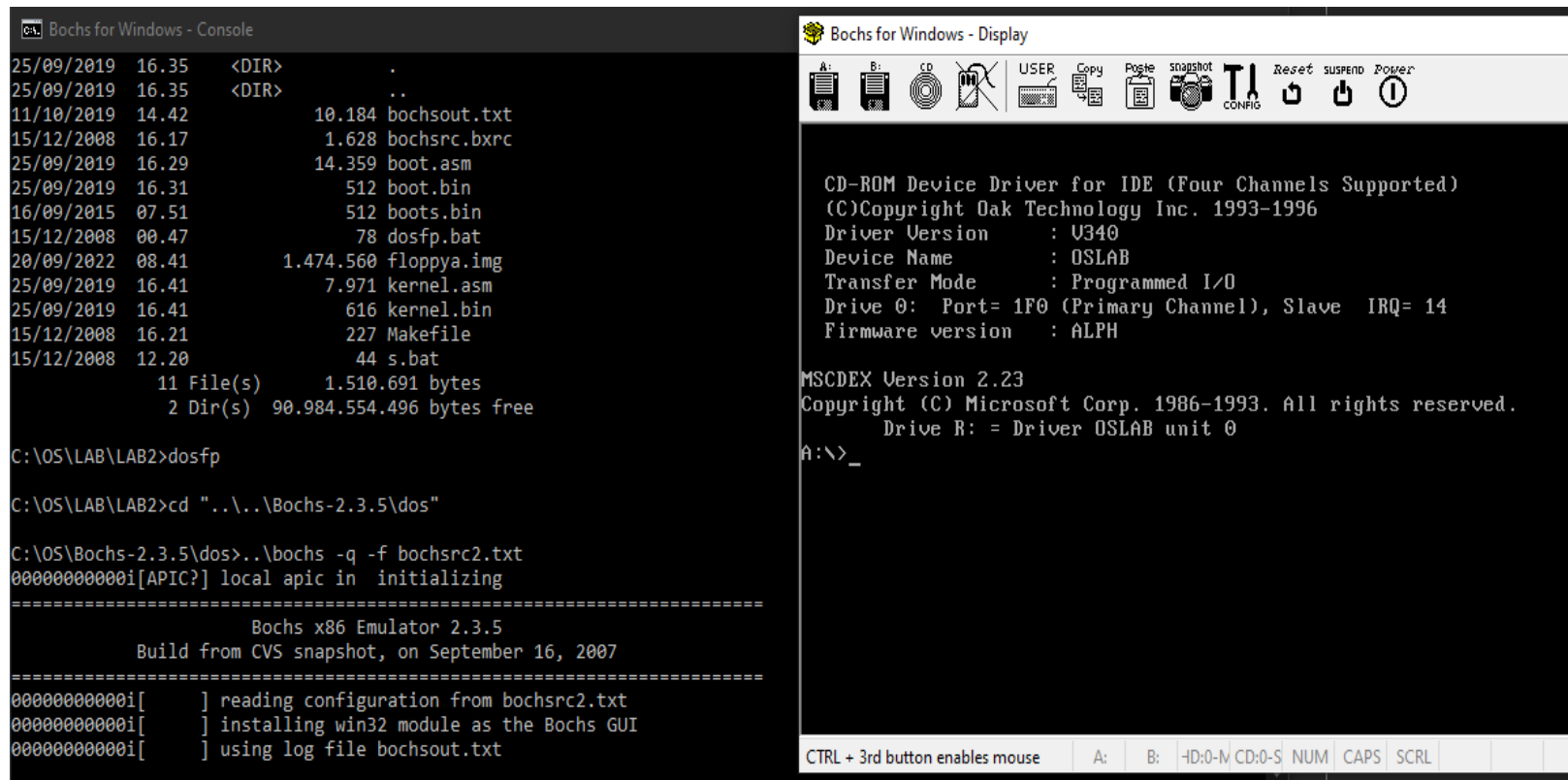
C:\OS\LAB\LAB2>dir
Volume in drive C is OS SSD
Volume Serial Number is F8C1-8320

Directory of C:\OS\LAB\LAB2

25/09/2019  16.35    <DIR>          .
25/09/2019  16.35    <DIR>          ..
11/10/2019  14.42           10.184 bochsout.txt
15/12/2008  16.17           1.628 bochsrc.bxrc
25/09/2019  16.29           14.359 boot.asm
25/09/2019  16.31           512 boot.bin
16/09/2015  07.51           512 boots.bin
15/12/2008  00.47           78 dosfp.bat
20/09/2022  08.41       1.474.560 floppya.img
25/09/2019  16.41           7.971 kernel.asm
25/09/2019  16.41           616 kernel.bin
15/12/2008  16.21           227 Makefile
15/12/2008  12.20           44 s.bat
                11 File(s)      1.510.691 bytes
                2 Dir(s)  90.984.554.496 bytes free

C:\OS\LAB\LAB2>
```

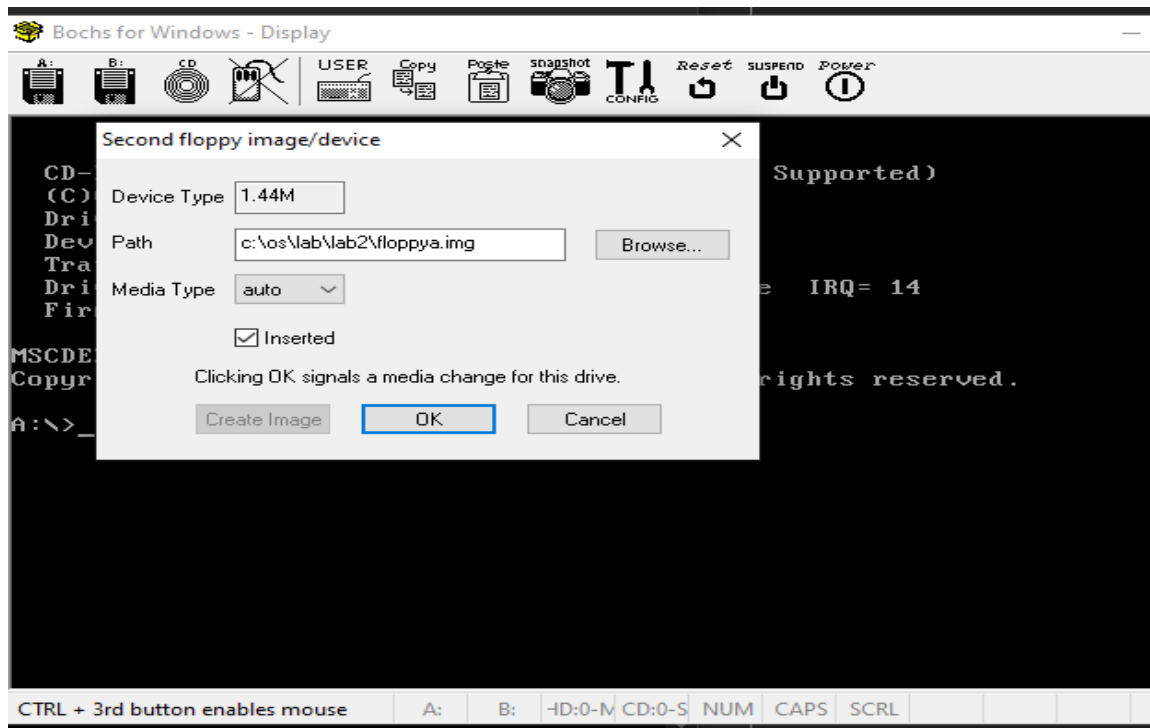
Ketik **“dosfp”** untuk pindah ke ”Bochs Windows”



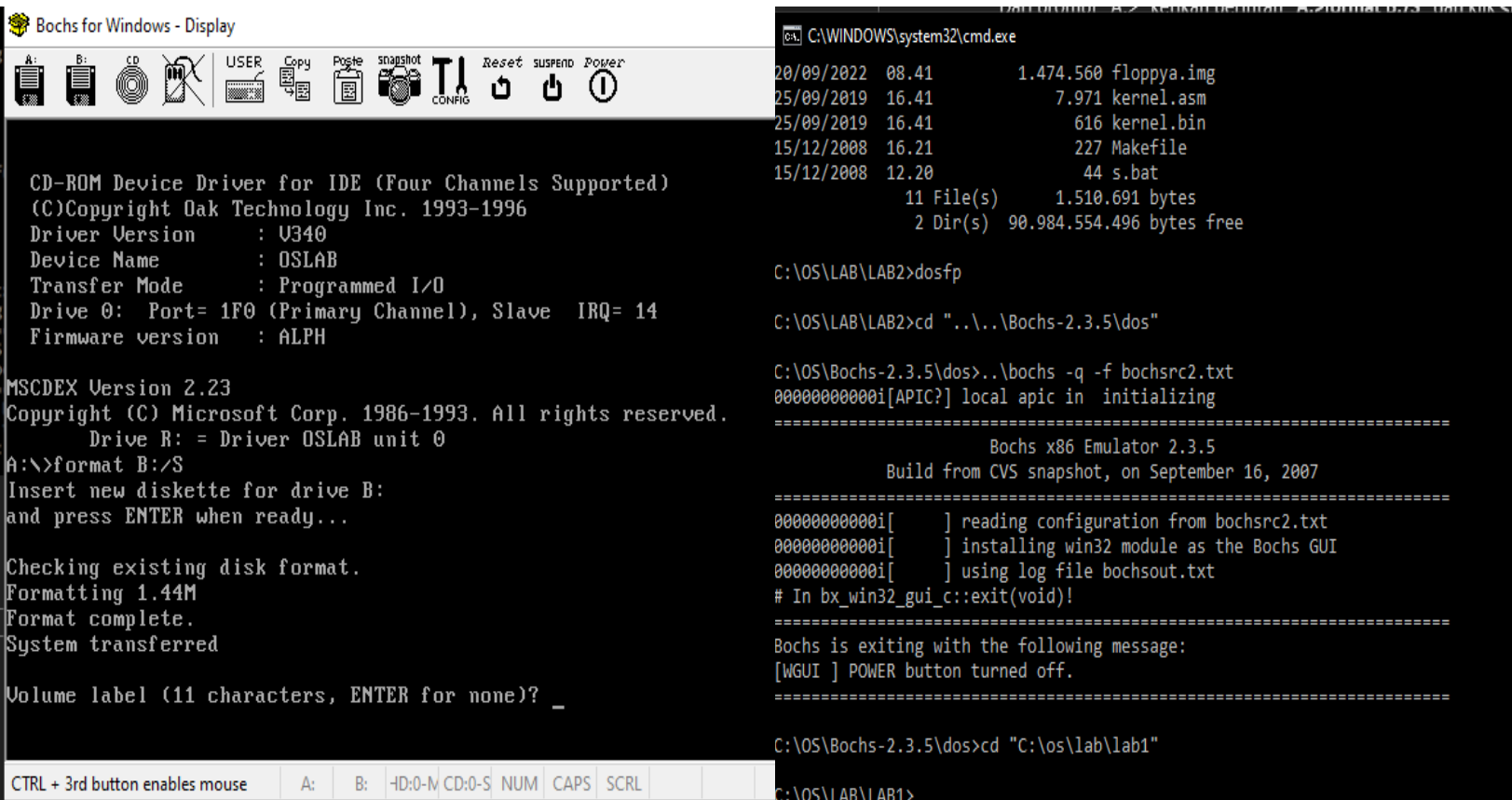
Klik menu gambar floppy disk nomor dua dari kanan



**Atur lokasi file image** sehingga menunjuk ke file “floppya.img” yang terdapat pada direktori kerja “lab2” dan atur sehingga location berada di **“C:\OS\Lab\Lab2\floppya.img ”** lalu klik **“Ok”**

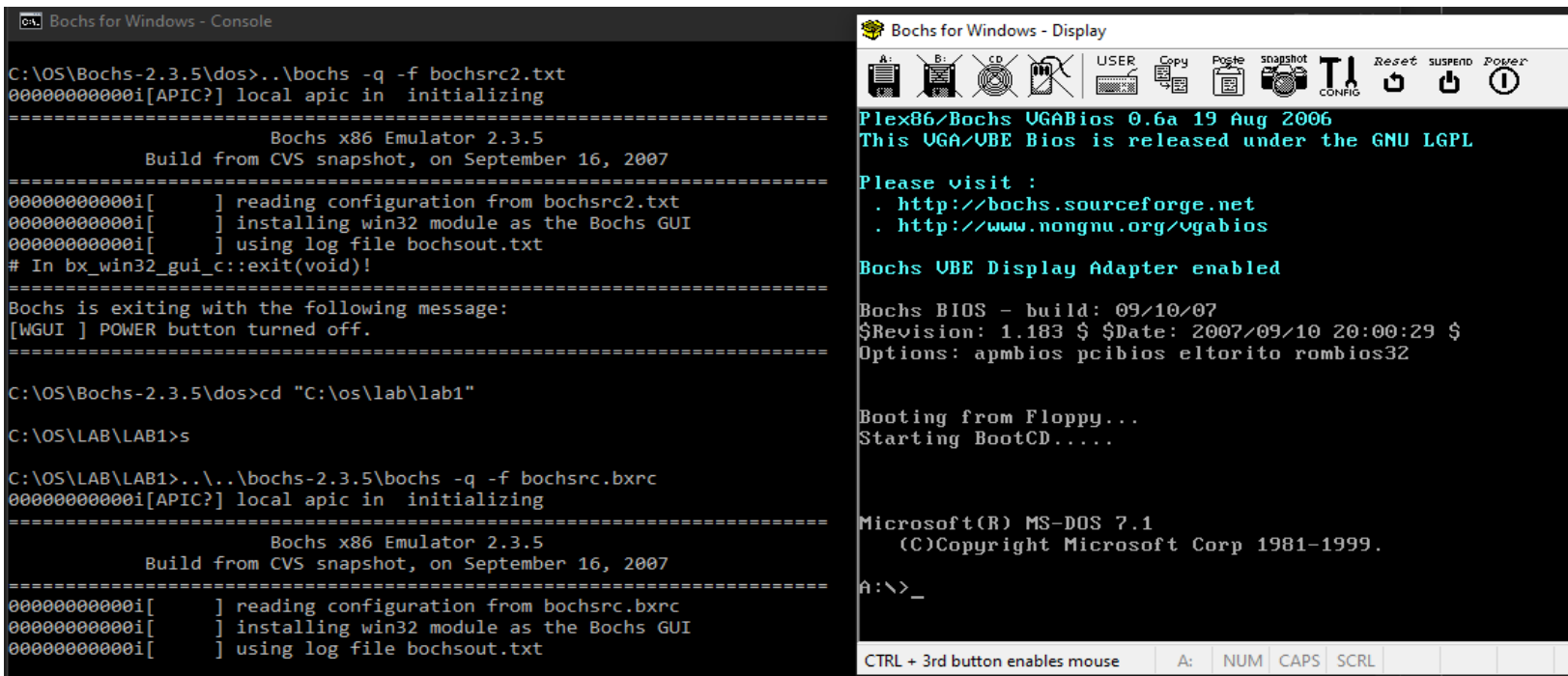


Dari prompt “A:” ketikkan perintah **“ A:>format B:/S ”** dan klik **<ENTER> 2X**. Lalu Klik **“Power Off”**





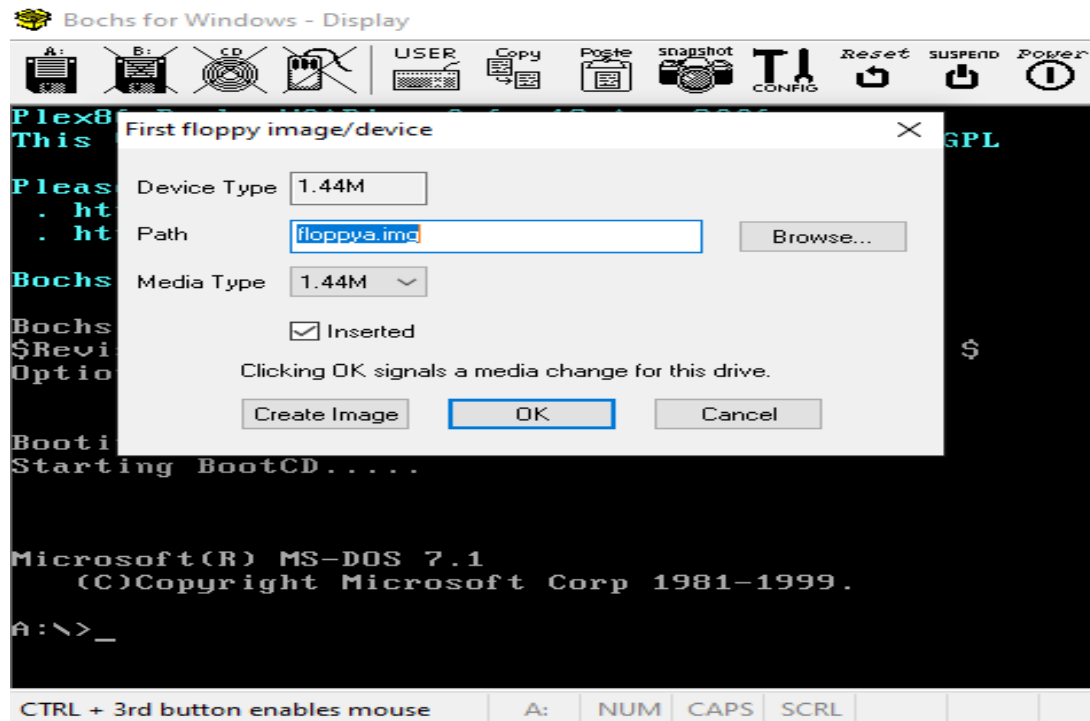
Boot PC-simulator dengan file “floppya.img”. Pindah ke direktori kerja pada window “Command Prompt” dan ketikkan “s” lalu **<ENTER>**. PC-Simulator akan melakukan proses boot dengan disk boot yang berasal dari file “floppya.img” yang diletakkan di “drive A:”.



Lalu “klik tombol gambar paling kiri”.



Lalu pastikan location berada di floppya.img. Jika sudah sesuai, tutup kembali PC-Simulator, klik tombol “Power”



Karena saya berada di `C:\Lab\Lab1` maka saya pindahkan menjadi ke `C:\Lab\Lab2` dengan cara ketik `cd ..`

```

C:\WINDOWS\system32\cmd.exe

C:\OS\LAB\LAB1>s

C:\OS\LAB\LAB1>..\..\bochs-2.3.5\bochs -q -f bochsrc.bxrc
00000000000i[APIC?] local apic in  initializing
=====
                Bochs x86 Emulator 2.3.5
                Build from CVS snapshot, on September 16, 2007
=====
00000000000i[      ] reading configuration from bochsrc.bxrc
00000000000i[      ] installing win32 module as the Bochs GUI
00000000000i[      ] using log file bochsout.txt
# In bx_win32_gui_c::exit(void)!
=====
Bochs is exiting with the following message:
[WGUI ] POWER button turned off.
=====

C:\OS\LAB\LAB1>cd ..

C:\OS\LAB>_
  
```

Lalu menuju ke lab 2 dengan ketik **"cd lab2"**.

```
C:\WINDOWS\system32\cmd.exe

C:\OS\LAB\LAB1>s

C:\OS\LAB\LAB1>..\..\bochs-2.3.5\bochs -q -f bochsrc.bxrc
00000000000i[APIC?] local apic in  initializing
=====
                Bochs x86 Emulator 2.3.5
            Build from CVS snapshot, on September 16, 2007
=====
00000000000i[      ] reading configuration from bochsrc.bxrc
00000000000i[      ] installing win32 module as the Bochs GUI
00000000000i[      ] using log file bochsout.txt
# In bx_win32_gui_c::exit(void)!
=====
Bochs is exiting with the following message:
[WGUI ] POWER button turned off.
=====

C:\OS\LAB\LAB1>cd ..

C:\OS\LAB>cd lab2

C:\OS\LAB\LAB2>_
```

Lalu ketikan **"make fp.disk "** dan **<ENTER>**.

```
C:\WINDOWS\system32\cmd.exe

C:\OS\LAB>cd lab2

C:\OS\LAB\LAB2>s

C:\OS\LAB\LAB2>..\..\bochs-2.3.5\bochs -q -f bochsrc.bxrc
00000000000i[APIC?] local apic in  initializing
=====
                Bochs x86 Emulator 2.3.5
            Build from CVS snapshot, on September 16, 2007
=====
00000000000i[      ] reading configuration from bochsrc.bxrc
00000000000i[      ] installing win32 module as the Bochs GUI
00000000000i[      ] using log file bochsout.txt
# In bx_win32_gui_c::exit(void)!
=====
Bochs is exiting with the following message:
[WGUI ] POWER button turned off.
=====

C:\OS\LAB\LAB2>make fp.disk
nasm boot.asm -o boot.bin -f bin
dd if=boot.bin of=floppya.img
rawwrite dd for windows version 0.5.
Written by John Newbigin <jn@it.swin.edu.au>
This program is covered by the GPL.  See copying.txt for details
1+0 records in
1+0 records out

C:\OS\LAB\LAB2>_
```

Lalu ketikan **" s "**

```
Bochs for Windows - Console
00000000000i[      ] reading configuration from bochsrc.bxrc
00000000000i[      ] installing win32 module as the Bochs GUI
00000000000i[      ] using log file bochsout.txt
# In bx_win32_gui_c::~exit(void)!
=====
Bochs is exiting with the following message:
[WGUI ] POWER button turned off.
=====
C:\OS\LAB\LAB2>make fp.disk
nasm boot.asm -o boot.bin -f bin
dd if=boot.bin of=floppya.img
rawwrite dd for windows version 0.5.
Written by John Newbigin <jn@it.swin.edu.au>
This program is covered by the GPL. See copying.txt for details
1+0 records in
1+0 records out
C:\OS\LAB\LAB2>s
C:\OS\LAB\LAB2>..\..\bochs-2.3.5\bochs -q -f bochsrc.bxrc
00000000000i[APIC?] local apic in initializing
=====
                Bochs x86 Emulator 2.3.5
            Build from CVS snapshot, on September 16, 2007
=====
00000000000i[      ] reading configuration from bochsrc.bxrc
00000000000i[      ] installing win32 module as the Bochs GUI
00000000000i[      ] using log file bochsout.txt

Bochs for Windows - Display
Plex86/Bochs VGABios 0.6a 19 Aug 2006
This VGA/VE Bios is released under the GNU LGPL

Please visit :
. http://bochs.sourceforge.net
. http://www.nongnu.org/vgabios

Bochs VBE Display Adapter enabled

Bochs BIOS - build: 09/10/07
$Revision: 1.183 $ $Date: 2007/09/10 20:00:29 $
Options: apmbios pcbios eltorito rombios32

Booting from Floppy...

teknik informatika
.....
ERROR : Press Any Key to Reboot_

CTRL + 3rd button enables mouse  A: NUM CAPS SCRL
```

Untuk menyunting file “boot.asm”, ketikan **“notepad boot.asm”** dan **<ENTER>**

```
C:\WINDOWS\system32\cmd.exe
C:\OS\LAB\LAB2>make fp.disk
nasm boot.asm -o boot.bin -f bin
dd if=boot.bin of=floppya.img
rawwrite dd for windows version 0.5.
Written by John Newbigin <jn@it.swin.edu.au>
This program is covered by the GPL. See copying.txt for details
1+0 records in
1+0 records out
C:\OS\LAB\LAB2>s
C:\OS\LAB\LAB2>..\..\bochs-2.3.5\bochs -q -f bochsrc.bxrc
00000000000i[APIC?] local apic in initializing
=====
                Bochs x86 Emulator 2.3.5
            Build from CVS snapshot, on September 16, 2007
=====
00000000000i[      ] reading configuration from bochsrc.bxrc
00000000000i[      ] installing win32 module as the Bochs GUI
00000000000i[      ] using log file bochsout.txt
# In bx_win32_gui_c::~exit(void)!
=====
Bochs is exiting with the following message:
[WGUI ] POWER button turned off.
=====
C:\OS\LAB\LAB2>notepad boot.asm
C:\OS\LAB\LAB2>

boot.asm - Notepad
File Edit Format View Help
; *****
; LAB-1 : boot-strap loader - real mode
; untuk memindahkan file OS dari floppy disk format DOS FAT12
; *****
;
; atur mode kerja 16 bit (real-mode)
[BITS 16]
;
; Menentukan lokasi awal dari program
[ORG 0x0000]
;
; loncat ke label START
jmp  START
;
; Keterangan format floppy disk format FAT12

OEM_ID      db "QUASI-OS"
BytesPerSector  dw 0x0200
SectorsPerCluster  db 0x01
ReservedSectors  dw 0x0001
<
Ln 1, Col 1 100% Windows (CRLF) ANSI
```

Cari teks “Loading Kernel”, kelompok baris bawah pada windows “notepad”

Untuk menemukan teks “Loading Kernel” tekan tombol “ CTRL + F ” dan masukan kata kunci “Loading Kernel”

Atau Scroll paling bawah sampai menemukan ‘ *msgloading db 0x0D, 0x0D, 0x0A, “teknik informatika”, 0x0A, 0x00* ‘

Pada file sebelumnya nama “Loading Kernel” sudah diganti menjadi “teknik informatika”

```
boot.asm - Notepad
File Edit Format View Help
; absolute track = logical sector / (sectors per track * number of heads)
;*****
LBACHS:
    xor     dx, dx                ; prepare dx:ax for operation
    div     WORD [SectorsPerTrack] ; calculate
    inc     dl                    ; adjust for sector 0
    mov     BYTE [absoluteSector], dl
    xor     dx, dx                ; prepare dx:ax for operation
    div     WORD [NumHeads]       ; calculate
    mov     BYTE [absoluteHead], dl
    mov     BYTE [absoluteTrack], al
    ret

absoluteSector db 0x00
absoluteHead   db 0x00
absoluteTrack  db 0x00

datasector dw 0x0000
cluster    dw 0x0000
ImageName  db "KERNEL BIN"
msgLoading db 0x0D, 0x0A, "teknik informatika", 0x0D, 0x0A, 0x00
msgCRLF    db 0x0D, 0x0A, 0x00
msgProgress db ".", 0x00
msgFailure db 0x0D, 0x0A, "ERROR : Press Any Key to Reboot", 0x00

TIMES 510-($-$$) DB 0
DW 0xAA55
;*****
```

Lalu edit menjadi **msgloading db 0x0D, 0x0D, 0x0A, “Belajar membuat BOOTSTRAP-LOADER”, 0x0A, 0x00**

*Dan juga edit menjadi ‘ msgFailure db 0x0D, 0x0A, "ERROR : Press Any Key to Reboot", 0x00 ‘*

```

boot.asm - Notepad
File Edit Format View Help
; absolute track = logical sector / (sectors per track * number of heads)
;
;*****
LBACHS:
xor dx, dx ; prepare dx:ax for operation
div WORD [SectorsPerTrack] ; calculate
inc dl ; adjust for sector 0
mov BYTE [absoluteSector], dl
xor dx, dx ; prepare dx:ax for operation
div WORD [NumHeads] ; calculate
mov BYTE [absoluteHead], dl
mov BYTE [absoluteTrack], al
ret

absoluteSector db 0x00
absoluteHead db 0x00
absoluteTrack db 0x00

datasector dw 0x0000
cluster dw 0x0000
imageName db "KERNEL BIN"
msgLoading db 0x0D, 0x0A, "Belajar membuat BOOTSTRAP-LOADER", 0x0D, 0x0A, 0x00
msgCRLF db 0x0D, 0x0A, 0x00
msgProgress db " ", 0x00
msgFailure db 0x0D, 0x0A, "ERROR : Press Any Key to Reboot", 0x00

TIMES 510-($-$$) DB 0
DW 0xAA55
;*****

```

Lalu tekan tombol **“CTRL + S”** dan close notepad

Lalu ketik **“make fp.disk”** dan **<ENTER>**

```

C:\WINDOWS\system32\cmd.exe

C:\OS\LAB\LAB2>s

C:\OS\LAB\LAB2>..\..\bochs-2.3.5\bochs -q -f bochsrc.bxrc
00000000000i[APIC?] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
00000000000i[      ] reading configuration from bochsrc.bxrc
00000000000i[      ] installing win32 module as the Bochs GUI
00000000000i[      ] using log file bochsout.txt
# In bx_win32_gui_c::exit(void)!
=====
Bochs is exiting with the following message:
[WGUI ] POWER button turned off.
=====

C:\OS\LAB\LAB2>notepad boot.asm

C:\OS\LAB\LAB2>make fp.disk
nasm boot.asm -o boot.bin -f bin
dd if=boot.bin of=floppya.img
rawwrite dd for windows version 0.5.
Written by John Newbigin <jn@it.swin.edu.au>
This program is covered by the GPL. See copying.txt for details
1+0 records in
1+0 records out

C:\OS\LAB\LAB2>

```



Jika proses kompilasi selesai, ketikan “ s ”. Jika teks sudah sama seperti yang dituliskan tadi pada notepad file ”boot.asm”, lalu klik tombol “ Power ”

```
C:\Bochs for Windows - Console
00000000000i[      ] using log file bochsout.txt
# In bx_win32_gui_c::exit(void)!
=====
Bochs is exiting with the following message:
[WGUI ] POWER button turned off.
=====

C:\OS\LAB\LAB2>notepad boot.asm

C:\OS\LAB\LAB2>make fp.disk
nasm boot.asm -o boot.bin -f bin
dd if=boot.bin of=floppya.img
rawwrite dd for windows version 0.5.
Written by John Newbigin <jn@it.swin.edu.au>
This program is covered by the GPL. See copying.txt for details
1+0 records in
1+0 records out

C:\OS\LAB\LAB2>s

C:\OS\LAB\LAB2>..\..\bochs-2.3.5\bochs -q -f bochsrc.bxrc
00000000000i[APIC?] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
00000000000i[      ] reading configuration from bochsrc.bxrc
00000000000i[      ] installing win32 module as the Bochs GUI
00000000000i[      ] using log file bochsout.txt

C:\Bochs for Windows - Display
Plex86/Bochs UGABios 0.6a 19 Aug 2006
This UGA/UBE Bios is released under the GNU LGPL

Please visit :
. http://bochs.sourceforge.net
. http://www.nongnu.org/ugabios

Bochs UBE Display Adapter enabled

Bochs BIOS - build: 09/10/07
$Revision: 1.183 $ $Date: 2007/09/10 20:00:29 $
Options: apmbios pcibios eltorito rombios32

Booting from Floppy...

Belajar membuat BOOTSTRAP-LOADER
.....
ERROR : Press Any Key to Reboot_

CTRL + 3rd button enables mouse  A: NUM CAPS SCRL
```

Lalu ketik “ make kernel ”

```
C:\WINDOWS\system32\cmd.exe

C:\OS\LAB\LAB2>make fp.disk
nasm boot.asm -o boot.bin -f bin
dd if=boot.bin of=floppya.img
rawwrite dd for windows version 0.5.
Written by John Newbigin <jn@it.swin.edu.au>
This program is covered by the GPL. See copying.txt for details
1+0 records in
1+0 records out

C:\OS\LAB\LAB2>s

C:\OS\LAB\LAB2>..\..\bochs-2.3.5\bochs -q -f bochsrc.bxrc
00000000000i[APIC?] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
00000000000i[      ] reading configuration from bochsrc.bxrc
00000000000i[      ] installing win32 module as the Bochs GUI
00000000000i[      ] using log file bochsout.txt
# In bx_win32_gui_c::exit(void)!
=====
Bochs is exiting with the following message:
[WGUI ] POWER button turned off.
=====

C:\OS\LAB\LAB2>make kernel
nasm kernel.asm -o kernel.bin -f bin

C:\OS\LAB\LAB2>_
```

Periksa file baru pada directory yaitu “kernel.bin” dengan mengetikan **“dir”**

```
C:\WINDOWS\system32\cmd.exe
Bochs is exiting with the following message:
[VGUI ] POWER button turned off.
=====

C:\OS\LAB\LAB2>make kernel
nasm kernel.asm -o kernel.bin -f bin

C:\OS\LAB\LAB2>dir
Volume in drive C is OS SSD
Volume Serial Number is F8C1-8320

Directory of C:\OS\LAB\LAB2

25/09/2019  16.35      <DIR>          .
25/09/2019  16.35      <DIR>          ..
20/09/2022  09.30           10.227 bochsout.txt
15/12/2008  16.17           1.628 bochsrc.bxrc
20/09/2022  09.28           14.373 boot.asm
20/09/2022  09.28             512 boot.bin
16/09/2015  07.51             512 boots.bin
15/12/2008  00.47              78 dosfp.bat
20/09/2022  09.28       1.474.560 floppya.img
25/09/2019  16.41           7.971 kernel.asm
20/09/2022  09.31           616 kernel.bin
15/12/2008  16.21           227 Makefile
15/12/2008  12.20            44 s.bat
               11 File(s)        1.510.748 bytes
               2 Dir(s)   91.060.731.904 bytes free

C:\OS\LAB\LAB2>
```

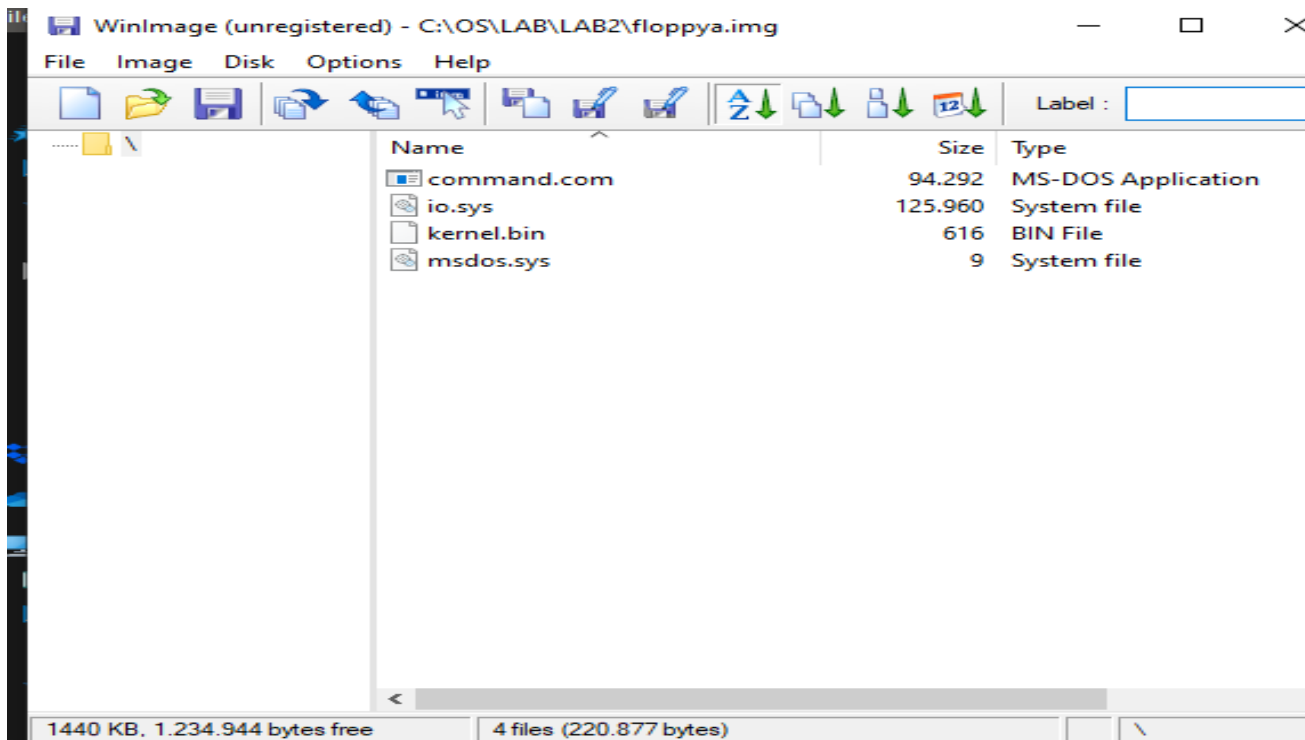
Memindahkan file “kernel.bin” ke dalam file image “floppya.img”.

Buka **“Winimage”**.

Buka directory kerja dan cari “ C:\OS\LAB\LAB2 ”, lalu klik “floppya.img”.

Klik menu **“Image”**. Lalu **“inject”**. Lalu cari nama file **“kernel.bin”**, klik **“ok”** dan Save. Dengan **“CTRL + S”** atau dengan klik menu “File” dan pilih save





Ketik “ s ”

```

C:\WINDOWS\system32\cmd.exe
16/09/2015 07.51 512 boots.bin
15/12/2008 00.47 78 dosfp.bat
20/09/2022 09.28 1.474.560 floppya.img
25/09/2019 16.41 7.971 kernel.asm
20/09/2022 09.31 616 kernel.bin
15/12/2008 16.21 227 Makefile
15/12/2008 12.20 44 s.bat
11 File(s) 1.510.748 bytes
2 Dir(s) 91.060.731.904 bytes free

C:\OS\LAB\LAB2>s

C:\OS\LAB\LAB2>..\..\bochs-2.3.5\bochs -q -f bochsrc.bxrc
0000000000i[APIC?] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
0000000000i[ ] reading configuration from bochsrc.bxrc
0000000000i[ ] installing win32 module as the Bochs GUI
0000000000i[ ] using log file bochsout.txt
# In bx_win32_gui_c::exit(void)!
=====
Bochs is exiting with the following message:
[WGUI ] POWER button turned off.
=====

C:\OS\LAB\LAB2>notepad kernel.asm

C:\OS\LAB\LAB2>

```

```

kernel.asm - Notepad
File Edit Format View Help

;
; Prototype SIMPLE KERNEL ver 0.01
; LAB-INFORMATIKA
; =====
[org 0x000]
[bits 16]

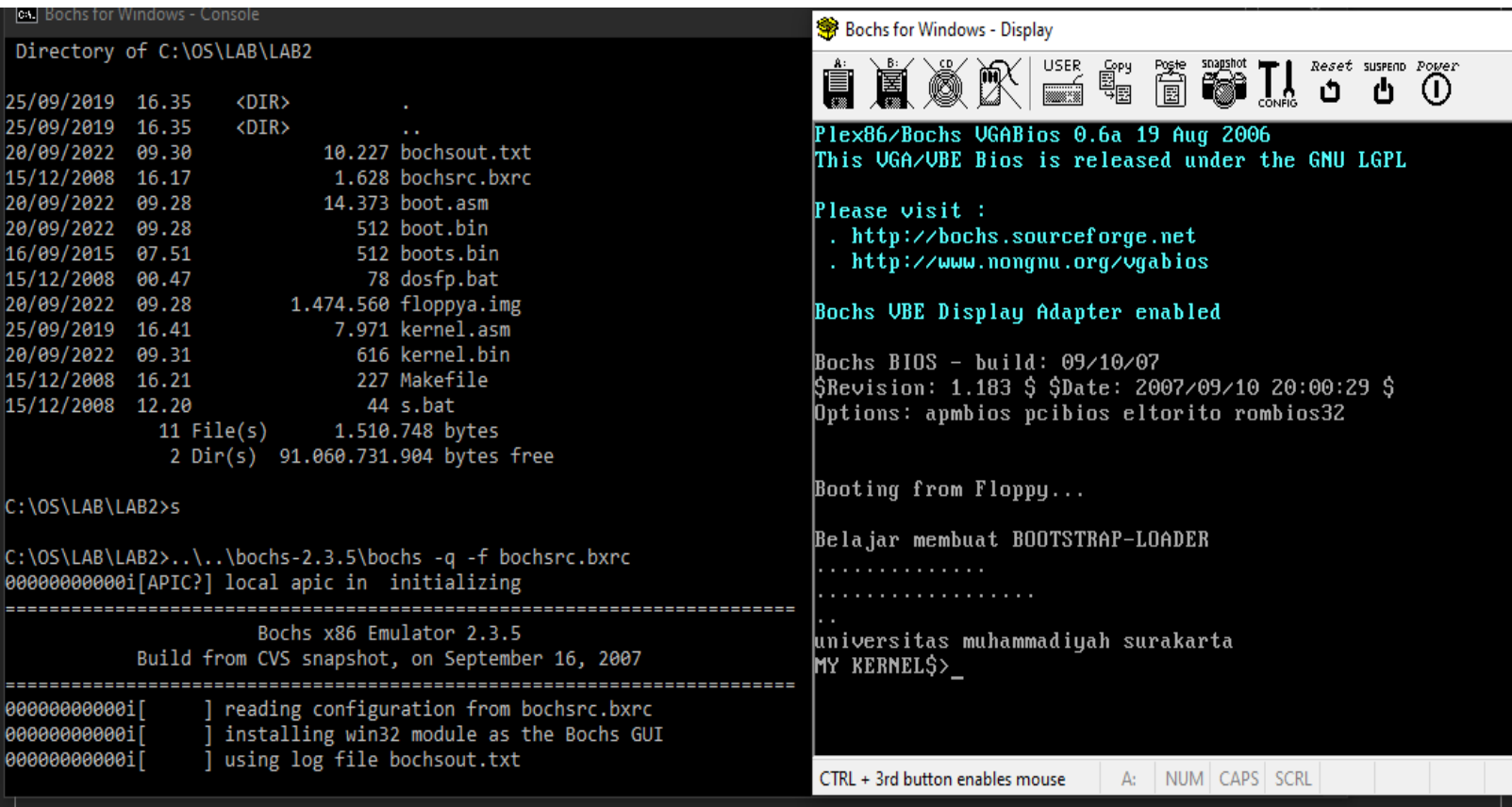
[SEGMENT .text]

;START #####
mov ax, 0x0100 ;Lokasi memori untuk menempatkan
mov ds, ax
mov es, ax

cli ;set interrupt OFF
mov ss, ax ;atur stack segment
mov sp, 0xFFFF ;atur stack pointer maksimum 64k
sti ;set interrupt ON

push dx
push es

```



Ketik **“Notepad kernel.asm”**

Cari teks “Welcome to My KERNEL”, kelompok baris bawah pada windows “notepad”

Untuk menemukan teks “Loading Kernel” tekan tombol “CTRL + F” dan masukan kata kunci “Welcome to My KERNEL”

Atau Scroll paling bawah sampai menemukan **strWelcomeMsg db "universitas muhammadiyah surakarta", 0x00** ‘

Ubah menjadi ‘ **strWelcomeMsg db "Belajar Membuat KERNEL", 0x00** ‘

```

kernel.asm - Notepad
File Edit Format View Help
    mov al, 0x01
    int 0x21
    ret

[SEGMENT .data]
    strWelcomeMsg db "Belajar Membuat KERNEL", 0x00
    strPrompt      db "MY KERNEL$>", 0x00
    cmdMaxLen      db 255 ; maksimum COMMAND

    strOsName      db "MY KERNEL", 0x00 ; OS details
    strMajorVer    db "0", 0x00
    strMinorVer    db ".03", 0x00

    cmdVer         db "ver", 0x00 ; COMMAND internal
    cmdExit        db "exit", 0x00

    txtVersion     db "version", 0x00
    msgUnknownCmd  db "COMMAND tidak dimengerti atau nama file salah!", 0x00

[SEGMENT .bss]
    strUserCmd      resb 256 ; buffer untuk menampung user commands
    cmdChrCnt       resb 1 ; hitungan jumlah karakter
    strCmd0         resb 256 ; buffers untuk menampung komponen COMMAND
    strCmd1         resb 256
    strCmd2         resb 256
    strCmd3         resb 256
    strCmd4         resb 256

;***** akhir code MY KERNEL *****

```

Ketik **“ make kernel ”**

```

C:\WINDOWS\system32\cmd.exe

25/09/2019 16.41 7.971 kernel.asm
20/09/2022 09.31 616 kernel.bin
15/12/2008 16.21 227 Makefile
15/12/2008 12.20 44 s.bat
          11 File(s) 1.510.748 bytes
          2 Dir(s) 91.060.731.904 bytes free

C:\OS\LAB\LAB2>s

C:\OS\LAB\LAB2>..\..\bochs-2.3.5\bochs -q -f bochsrc.bxrc
0000000000i[APIC?] local apic in initializing
=====
                Bochs x86 Emulator 2.3.5
                Build from CVS snapshot, on September 16, 2007
=====
0000000000i[      ] reading configuration from bochsrc.bxrc
0000000000i[      ] installing win32 module as the Bochs GUI
0000000000i[      ] using log file bochsout.txt
# In bx_win32_gui_c::exit(void)!
=====
Bochs is exiting with the following message:
[WGUI ] POWER button turned off.
=====

C:\OS\LAB\LAB2>notepad kernel.asm

C:\OS\LAB\LAB2>make kernel
nasm kernel.asm -o kernel.bin -f bin

C:\OS\LAB\LAB2>

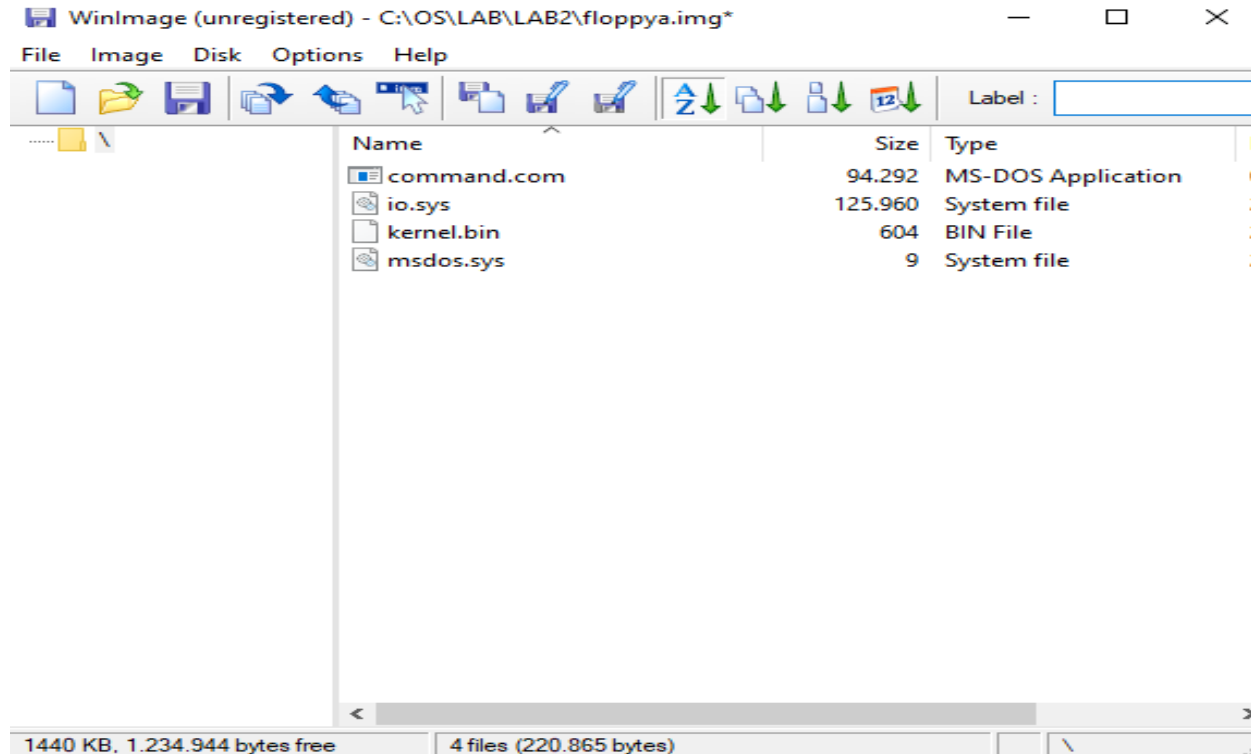
```

Memindahkan file “kernel.bin” ke dalam file image “floppya.img”.

Buka **“Winimage “**.

Buka directory kerja dan cari “ C:\OS\LAB\LAB2 ”, lalu klik “floppya.img”.

Klik menu **“ Image “**. Lalu **“ inject “**. Lalu cari nama file **“ kernel.bin ”**, klik **“ok”** dan Save. Dengan **“ CTRL + S ”** atau dengan klik menu “File” dan pilih save



Jalan PC-Simulator dengan Ketikan “ s ”. Jika tidak terjadi error maka di “Bochs Windows” terdapat teks yang sama yang tadi sudah dituliskan.

```
Bochs for Windows - Console
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
0000000000i[      ] reading configuration from bochsrc.bxrc
0000000000i[      ] installing win32 module as the Bochs GUI
0000000000i[      ] using log file bochsout.txt
# In bx_win32_gui_c::exit(void)!
=====
Bochs is exiting with the following message:
[WGUI ] POWER button turned off.
=====

C:\OS\LAB\LAB2>notepad kernel.asm

C:\OS\LAB\LAB2>make kernel
nasm kernel.asm -o kernel.bin -f bin

C:\OS\LAB\LAB2>s

C:\OS\LAB\LAB2>..\..\bochs-2.3.5\bochs -q -f bochsrc.bxrc
0000000000i[APIC?] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
0000000000i[      ] reading configuration from bochsrc.bxrc
0000000000i[      ] installing win32 module as the Bochs GUI
0000000000i[      ] using log file bochsout.txt
=====

Bochs for Windows - Display
=====
Plex86/Bochs VGABios 0.6a 19 Aug 2006
This VGA/VE Bios is released under the GNU LGPL

Please visit :
. http://bochs.sourceforge.net
. http://www.nongnu.org/vgabios

Bochs VBE Display Adapter enabled

Bochs BIOS - build: 09/10/07
$Revision: 1.183 $ $Date: 2007/09/10 20:00:29 $
Options: apmbios pcibios eltorito rombios32

Booting from Floppy...

Belajar membuat BOOTSTRAP-LOADER
.....
.....
..
Belajar Membuat KERNEL
MY KERNEL$>_

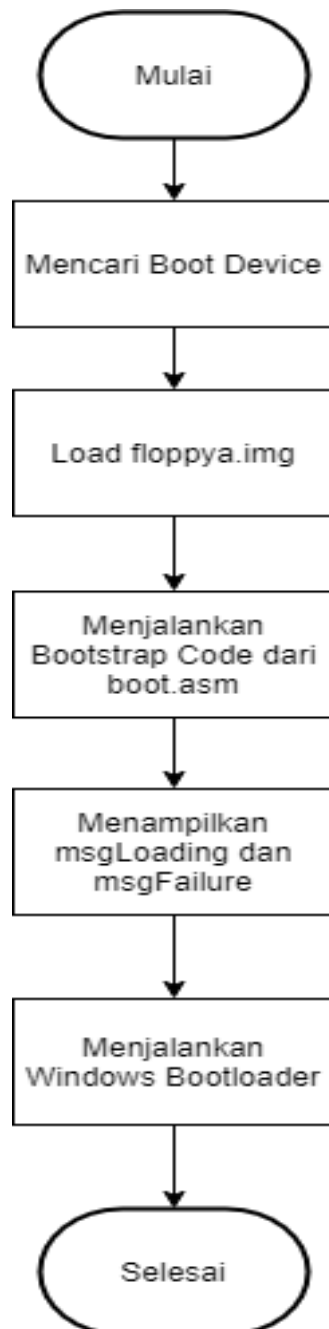
CTRL + 3rd button enables mouse  A: NUM CAPS SCRL
```

# TUGAS

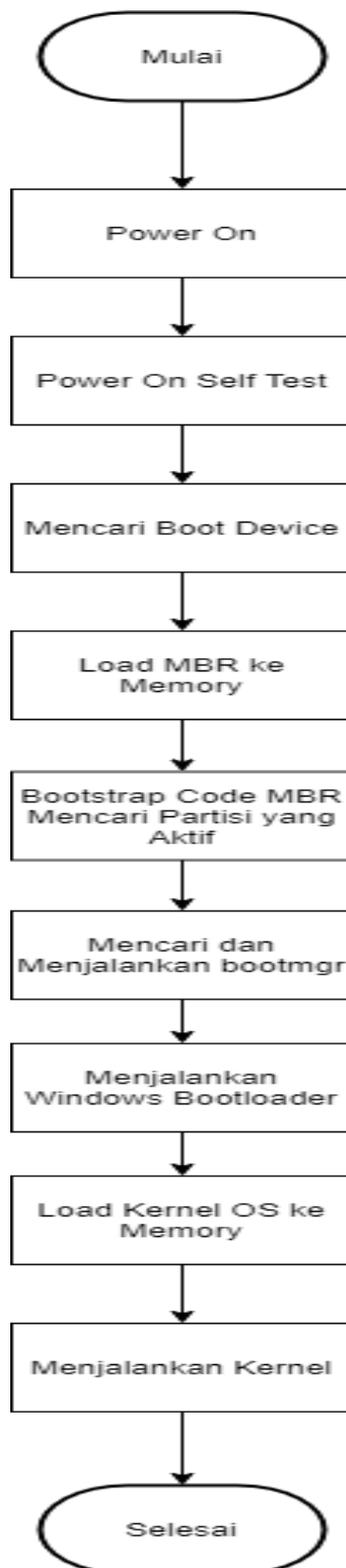
1. Buatlah algoritma dari program “ **boot.asm** ” dalam bentuk flowchart. *Buatlah dua jenis algoritma, pertama buat algoritma yang bersifat global dan kedua buat algoritma yang bersifat lebih detail*

**Jawab :**

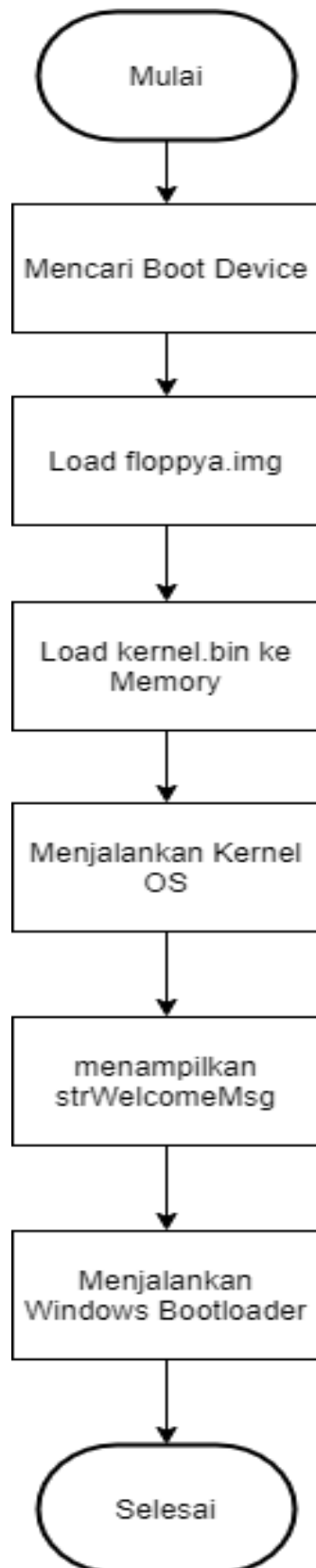
Flowchart algoritma yang bersifat *global*



Flowchart algoritma yang bersifat *lebih detail*

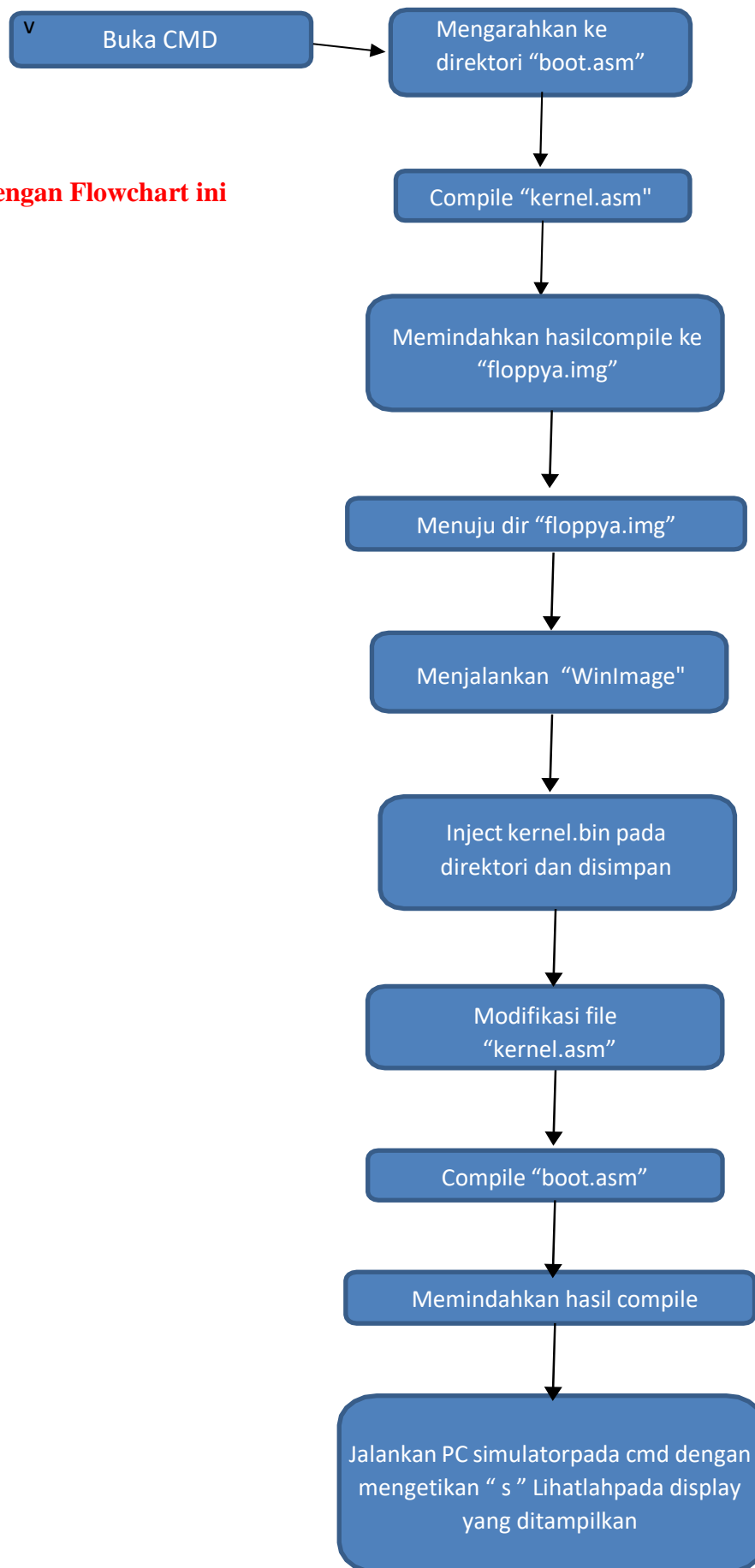


2. Buatlah algoritma dari program “ **kernel.asm** ” dalam bentuk flowchart.





Atau dengan Flowchart ini



أَلْعَالَمِينَ رَبِّ لِلَّهِ الْحَمْدُ